Natural Engineer
Version 4.3.1
Application Management
for Mainframes

Manual Order Number: NEE431-020MFR

This document applies to Natural Engineer version 4.3.1 and to all subsequent releases.

Specifications contained herein are subject to change, and these changes will be reported in subsequent revisions or editions.

Readers' comments are welcomed. Comments may be addressed to the Documentation Department at the address on the back cover. Internet users may send comments to the following e-mail address:

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ABOUT THIS MANUAL

Purpose of this manual

This manual covers the Application Management for Natural Engineer version 4.3.1.

It describes the various processes available that enable you to create and manage Natural applications within Natural Engineer.

The topics cover the Application options found under the Application menu, which include:

- How to create new applications, open existing applications and delete applications.
- Customizing the control of the application by setting preferences.

Also covered, are all the options to Extract and Load your Natural applications from the Natural application library into the Repository. An overview of the reporting available for these functions is also provided.

Target Audience

The target audience for this manual is intended to be any User of Natural Engineer 4.3.1 at any level of experience.

Typographical Conventions used in this manual

The following conventions are used throughout this manual:

UPPERCASE TIMES	Commands, statements, names of programs and utilities referred to in text paragraphs appear in normal (Times) uppercase.
UPPERCASE BOLD COURIER	In illustrations or examples of commands, items in uppercase bold courier must be typed in as they appear.
< >	Items in angled brackets are placeholders for user-supplied information. For example, if asked to enter <file number>, you must type the number of the required file.
Underlined	Underlined parts of text are hyperlinks to other parts within the online source manual. This manual was written in MS-Word 97 using the "hyperlink" feature.

The following symbols are used for instructions:

⇒	Marks the beginning of an instruction set.
❑	Indicates that the instruction set consists of a single step.
1.	Indicates the first of a number of steps.

How this manual is organized

This manual is organized to reflect all the Application Management options of Natural Engineer version 4.3.1 in the following chapters:

Chapter	Contents
1	Describes the various options available to select and delete applications, and set up preferences that define the application environments.
2	Describes the various extract and load processes available within Natural Engineer that allow you to load your applications into the Repository.
3	Describes the Soft Links option to specify object link information and the User Documentation option which allows you to specify comments for each object within an application on the Repository. This complements the object source code information already stored in the Repository.
4	Provides an overview of the reporting options available for the topics covered in this manual.

Terminology

It is assumed that you are familiar with general Natural and mainframe terminology, as well as the terms and concepts relating to MS-Windows environments. This section explains some terms that are specific to the Natural Engineer product.

Analysis

The Analysis process of Natural Engineer searches application data within the Natural Engineer Repository, according to specified Search Criteria and generates reports on the search results.

Application

An Application is a library or group of related libraries, which define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

Browser

An Internet Browser such as Microsoft Internet Explorer™ or Netscape™.

Category

Categories in Natural Engineer specify whether and how a Modification is applied to the Natural code. Valid categories are: Automatic change, Manual change, Reject the default Modification, No change to the data item, and the data item is in Generated Code.

A category is further broken down according to type of change (for example: Keyword, Literal, Data Item, Database Access, Definition).

Consistency

An option in the Analysis process that causes Natural Engineer to trace an Impact through the code, using left and right argument resolution to identify further code impacted by the code found.

Environment

The Environment process is the means by which Natural Engineer generates a structured view of the application code in the Natural Engineer Repository. This provides application analysis reports and inventory information on the application and is used as the basis for Impact Analysis.

Exception

An Exception is an Item identified as impacted that does not require a Modification. Where there are a few similar Exception Items, they can be treated as Exceptions, and rejected in the Modification review process. Where there are many similar (therefore not Exceptions), consideration should be given to changing the Search Criteria so they are not identified as impacted in the first place.

Generated Code

This is code which has been generated by a Natural code generator, such as Construct, and which is not normally modified directly in the Natural editor.

Impact

An Impact is an instance of a Natural code Item; e.g., data item or statement (a “hit” scored by the Analysis process) that matches the defined Search Criteria used in the Analysis process.

Iteration

An Iteration is one examination cycle of a field identified according to the specified Search Criteria. For example, one Iteration is reading the field right to left. Multiple Iterations are performed when the option of ‘Consistency’ or Multi Search is requested for Analysis, and Natural Engineer performs as many Iterations as necessary to exhaust all possibilities of expressing and tracing the field, and can be limited by a setting in the NATENG.INI file.

Library

A single library of source code, which exists in the Natural system file.

Modification

A Modification is a change suggested or made to an object or data item resulting in the required compliance of that object or data item. Modifications in Natural Engineer are classified according to Category and Type.

Presentation Split Process

The Presentation Split Process is a sub-function of the Object Builder function that removes screen I/O statements from current application objects and places them in generated subprograms.

Soft Link

A Soft Link is where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

Technical Split Process

The Technical Split Process is a sub-function of the Object Builder function that results in the encapsulation of each database access within the application, into a sub-program so that the application is separated into 'presentation and logic' and 'database access'.

Type

The Type of Modification available, for example: Data Item, Keyword and Literal.

TLM

Text Logic Members are used to contain the code required to support inclusion of common code into the application. An example of this is the code to include into an application before updating a database.

Related Literature

The complete set of Natural Engineer manuals consists of:

1. **Natural Engineer Concepts and Facilities (NEE431-006ALL)**

The Concepts and Facilities manual describes the many application systems problems and solutions offered by Natural Engineer, providing some guidelines and usage that can be applied to Natural applications.

2. **Natural Engineer Release Notes (NEE431-008ALL)**

The Release Notes describe all the information relating to the new features, upgrades to existing functions and documentation updates that have been applied to Natural Engineer 4.3.1.

3. **Natural Engineer Installation Guide (NEE431-010ALL)**

The Installation Guide provides information on how to install Natural Engineer on both PC and mainframe platforms.

4. **Natural Engineer Administration Guide (NEE431-040WIN)**

   Natural Engineer Administration Guide (NEE431-040MFR)

The Administration Guide provides information on all the various control settings available to control the usage of the different functions within Natural Engineer.

5. **Natural Engineer Application Management (NEE431-020WIN)**

   Natural Engineer Application Management (NEE431-020MFR)

The Application Management manual describes all the functions required to add Natural applications into the Repository.

6. **Natural Engineer Application Documentation (NEE431-022WIN)**

   Natural Engineer Application Documentation (NEE431-022MFR)

The Application Documentation manual describes all the available functions to document a Natural application within the Repository. These functions will help enhance / supplement any existing systems documentation such as BSD / CSD / Specifications etc.

7. **Natural Engineer Application Analysis and Modification (NEE431-023WIN)**

   Natural Engineer Application Analysis and Modification (NEE431-023MFR)

The Application Analysis and Modification manual describes all the available functions to carry out analysis of Natural applications; including basic keyword searches. The modification process is described and detailed to show how it can be applied to modify single selected objects within a Natural application, or the entire Natural application in one single execution.

8. **Natural Engineer Application Restructuring (NEE431-024WIN)**

   Natural Engineer Application Restructuring (NEE431-024MFR)

The Application Restructuring manual describes the analysis and modification functionality required to carryout some of the more sophisticated functions such as Object Builder.

9. **Natural Engineer Utilities (NEE431-080WIN)**

   Natural Engineer Utilities (NEE431-080MFR)

The Utilities manual describes all the available utilities found within Natural Engineer and, when and how they should be used.

10. **Natural Engineer Reporting (NEE431-025ALL)**

The Reporting manual describes each of the reports available in detail, providing report layouts, how to trigger the report and when the report data becomes available. The various report-producing mediums within Natural Engineer are also described.

11. **Natural Engineer Batch Processing [Mainframes] (NEE431-026MFR)**

The Batch Processing manual describes the various batch jobs (JCL) and their functionality.

1

MANAGING APPLICATIONS

Chapter Overview

This chapter describes how to select and manage applications for processing in Natural Engineer, and how to set up preferences for the applications.

In the context of Natural Engineer, ‘Application’ is as described in the Terminology section and is the name Natural Engineer uses to describe a library or set of related libraries.

An Application is a library or group of related libraries that define a complete Application. In Natural Engineer, the Application can have a one-to-one relationship with a single library of the same name, or a library of a different name, as well as related steplibs. The Application refers to all the source code from these libraries, which Natural Engineer loads into the Repository.

The following options are available from the Application menu and are described in this chapter:

1. **Select an Application**

Open an existing Application or define a new Application.

2. **Delete an Application**

Delete an Application from Natural Engineer.

3. **Delete Object**

Delete an object from the Natural Engineer Repository.

4. **Preferences**

Define Application preferences and defaults.

Select an Application

Use this option either to select a previously processed application from the list, or to specify a new application.

This is accessed by selecting option '**S**' (Select an Application) from the Application Menu screen.

This will open the Select Application screen, where an existing application can be selected or a new application name typed in.

Note: For a new application, if the application name you want to use in Natural Engineer is different from the library name in the FUSER, you will have to set the Natural Library parameter in the Preferences screen to the FUSER library name. For more information see the Application Preferences section in this chapter.

The following Figure 1-1 illustrates the Select Application screen.

```
                          - Select Application -

                        Application:  HOSPITAL

                             Sel  Applications
                              _     TST13900
                              _     TST22100
                              _     TST22300
                              _     TST23100
                              _     TS170101
                              _     TS170103
                              _     TS170104
                              _     TS170106
                              _     TS170401
                              _     TS170501
                              _     TS170601
                              _     TS170603

                       Reposition ->  ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit                   Prev  Next                   Main
```

Figure 1-1 Select Application screen

SCREEN ITEMS	DESCRIPTION
Application	The name of the application to be opened. This will be pre-filled with the currently selected application or blank if no previous application has been selected. This field can be used to specify a new application name or type in the name of an existing application.
Sel	Selects the application. Valid values are: '**S**' Select.
Applications	List of all the available applications on the Repository.
Reposition	Allows the list of Applications to be restarted from a particular application.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Delete an Application

This option allows you to delete an Application that exists in Natural Engineer. You have to select the Application from the Select an Application screen first.

All application data will be removed from the Natural Engineer Repository. This deletes all Application, Analysis and Modification information.

This is accessed by selecting option '**D**' (Delete an Application) from the Application Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 1-2 illustrates the NATRJE submission screen for the Delete an Application option.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  :  (APPDEL) APPLICATION DELETE

              Job Card details
              ----------------
                       Job Name  :  XGSLXX__
                       Job Class :  _


              Job Control Record details
              --------------------------
                                Control Status  :
              Last Job Submitted - Job Name     :
                                 - Opid         :
                                 - Step         :
                                 - Return Code  :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref              Rel               Main
```

Figure 1-2 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Delete Object

This allows you to select an object for deletion from the Natural Engineer Repository, with confirmation.

Use this option to remove object data from the Natural Engineer Repository. This deletes Application, Analysis and Modification information for the object.

Note: If the object is to be deleted permanently from the application Repository, you must also delete it from the source library, so that it is not re-extracted by error in the future.

This is accessed by selecting option '**O**' (Delete Object) from the Application Menu screen.

This will open the Delete Objects selection screen, where all the objects loaded for the currently selected application are listed. From here objects can be selected for deletion.

The following Figure 1-3 illustrates the Delete Objects screen.

```
                          - Delete Objects -        Application: HOSPITAL

                  Select  Object
                    _     XXCONPDA
                    _     XXCONUPD
                    _     XXEXIT
                    _     XXGETID
                    _     XXMTHVAL
                    _     XXTIDYUP
                    _     XXVALCC
                    _     XX000G00
                    _     XX001L01
                    _     XX001M01
                    _     XX001P01
                    _     XX002L01
                    _     XX002M01
                    _     XX002P01
                    _

            Reposition -> _____________________________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit                   Prev  Next                   Main
```

Figure 1-3 Delete Objects screen

SCREEN ITEMS	DESCRIPTION
Application	The name of the currently selected application.
Select	Selects the object. Valid values are: '**S**' Select.
Object	List of all the available objects for the currently selected application.
Reposition	Allows the list of Objects to be restarted from a particular object.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Once an object or multiple objects have been selected, use the '**ENTER**' key to invoke the deletion process. This will produce a pop-up confirmation window. Enter '**Y**' to delete the selected object or '**N**' to cancel deletion.

The following Figure 1-4 illustrates the Delete Object confirmation pop-up window.

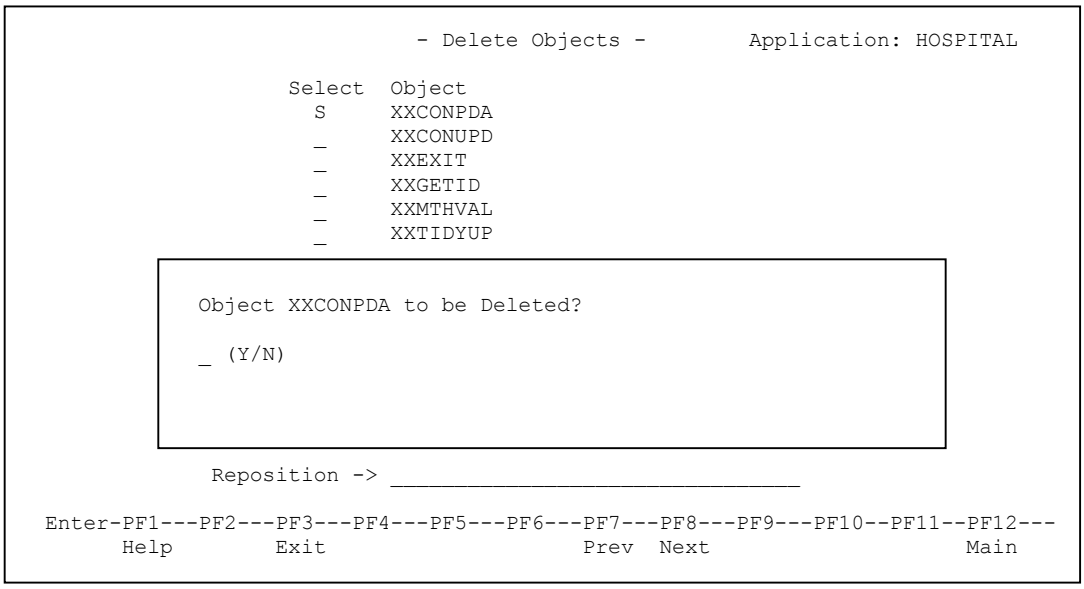

Figure 1-4 Delete Object confirmation pop-up window

Application Preferences

The Application Preferences screen allows you to define the preferences that are to be applied during the extract and modification processes within Natural Engineer.

For example, applications that make use of steplibs.

If an application makes use of steplibs, then these can be specified on the Application Preferences screen. This maybe applicable where applications make use of standard routines which are held on a separate natural library rather than including them within the application natural library.

Note: The steplibs would then need to be extracted and loaded into the Repository as applications in their own right, in order that Natural Engineer can build the necessary cross-reference information and maintain integrity with the applications using the steplib.

This is accessed by selecting option '**P**' (Preferences) from the Application Menu screen.

The following Figure 1-5 illustrates the Application Preferences screen.

```
                          - Set Preferences -        Application: HOSPITAL


             *STEPLIB:  SYSTEM__            Impact Mode:  RE-ENG__
                                          Modification Mode:  NATURAL 2.2_
             Steplibs:  ________
                        ________        Extract Environment:  WIN NT____
                        ________
                        ________
                        ________
                        ________
                        ________
                        ________

      Natural Library:  ________
  Modification Library:  ________

    Modify To Steplib:  N


Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Save                                      Main
```

Figure 1-5 Application Preferences screen

SCREEN ITEMS	DESCRIPTION
***STEPLIB**	The master steplib library name assigned to the Natural system variable *STEPLIB. This is normally set to SYSTEM.
Steplibs	This option allows you to define multiple Steplib libraries from which Natural Engineer can retrieve objects referenced from the primary Natural library. You can define up to 8 steplib Natural library names that Natural Engineer will search for the application code. Natural Engineer will search the steplib chain for the following items if they do not exist on the base library: *Note: A steplib library name cannot be the same as the Application name or the base Natural library name.*
	Data Areas (LDAs, PDAs GDAs) **Copycode** **Subprograms** (invoked via CALLNAT) **Programs** (invoked via FETCH/FETCH RETURN/FETCH REPEAT) **Maps** (invoked by INPUT USING MAP/WRITE USING FORM) **Helproutines** (invoked via HE=) **Objects** (invoked via STACK TOP COMMAND/STACK COMMAND) **DDMs** *Note: For the STACK command, Natural Engineer will attempt to determine if the command that is being stacked is an actual object or not. It does this by interrogating an exclude table that lists common commands that are not objects e.g. STOW, EDIT.*
Natural Library	If the Natural Engineer Application name is to be different from the library name in the FUSER, specify the actual FUSER library name in the Natural library field. If a Natural Library is not specified, Natural Engineer assumes that the application name is the same as the FUSER library name.

SCREEN ITEMS	DESCRIPTION
Modification Library	Use the Modification Library field if you wish to specify a library that the modified code will be written to. If a Modification Library is not specified Natural Engineer places all modified code in a library name with an 'X' as the last character of the application name. If the name is already 8 characters long, the last character is removed and replaced with the 'X'. The Modification Library name can be the same as the base Natural Library name. This allows any modified objects from the modification process to be applied to the base Natural Library. If this is set, a warning message is produced to highlight that the base Natural Library will be updated.
Modify to Steplibs?	This option allows you to specify to where objects that are on steplib libraries are to be modified, either to the Steplib library or the Application Modification library. '**N**' Modify all objects to the application Modification library. '**Y**' Modify steplib objects in the application to the steplib Modification library.
Impact Mode	The Impact Mode identifies the type of Analysis that will be performed by Natural Engineer. Valid options are: **Re-Eng** Use this option to execute Analysis using general Reengineering functionality. The Default Mode.
Modification Mode	This option is used to determine which Natural version code options are to be used for Modification. Selections available are **Natural 2.2** This will use Natural 2.2 code options. **Natural 2.3** This will use Natural 2.3 code options.
Extract Environment	This is a documentation facility used by Natural Engineer's Reengineering functions, which specifies the application environment from which the Natural source code comes. Selections available are: **MVS** **LightStorm** **Win NT** **Unix** **VMS** **BS2000** **VSE**

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF5	Save Application Preferences.
PF12	Returns to the Natural Engineer Main Menu.

2

BUILDING A REPOSITORY OF YOUR APPLICATIONS

Chapter Overview

The first stage in using Natural Engineer is to build a comprehensive Repository of information on your Natural applications, creating a structured view of the application code and providing application Analysis and inventory information. The following options are available from the Environment menu and are described in this chapter:

1. **Extract Selection Criteria**

Select one or more objects from the Natural System File for extraction.

2. **Extract Source Code**

Extracts the Natural source codes and creates an output file of neutral records.

3. **Load Repository**

Loads the Extract output file information into the Natural Engineer Repository.

4. **Extract & Load**

Allows you to execute both the Extract and the Load processes in one single step.

5. **Extract, Load & Impact**

Allows you to execute all of the Extract, Load and Impact Analysis processes in one step, using previously defined Search Criteria.

6. **Extract Missing Objects**

Extracts the objects identified as missing on the Missing Objects Report.

Extract Selection Criteria

You use this option to select one or more objects from the Natural System File for extraction. This function is optional; it allows you to include selected objects that may have changed as a result of maintenance.

You can specify individual objects, select several objects using wildcards, and ranges of objects using the Extract Selection Criteria dialog box illustrated below:

The default for Extract Selection Criteria is to extract all objects from the Natural application library specified in application preferences.

Note: Refer to the section Application Preferences in Chapter 1 for more information on application preferences.

Extract Selection Criteria Screen

The Extract Selection Criteria screen is accessed by selecting option '**S**' (Extract Selection Criteria) from the Environment Menu screen.

The following Figure 2-1 illustrates the Extract Selection Criteria screen.

```
                    - Extract Selection Criteria -  Application: HOSPITAL
                                                          Version:
                                  Start          End
                         Opt      Object        Object
                          _      *_______      ________









                                  (YYYYMMDD)
                       Saved Date   __  ________
                       Object Type  *
                      Synchronize   _
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help  Miss  Exit        Save        Prev  Next        Top         Main
```

Figure 2-1 Extract Selection Criteria screen

SCREEN ITEMS	DESCRIPTION
Opt	Line command options. Valid options are: '**I**' Insert a new line. '**D**' Delete the current line.
Start Object	The name of the first object to be extracted. This can be a single object name or part of a range of objects if End Object has been specified. Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.
End Object	The name of the last object to be extracted. This is only valid if a Start Object has been specified. Note: Refer to the section Specifying Object Names below for more information on how to specify object names and ranges.
Saved Date	This option allows you to specify the Saved Date of the object in the Natural System File. If specified, the Extract process will only extract objects that meet the specified range.
Saved Date Operator	This option allows you to specify the operator to be used with the Saved Date value specified. Options are:

Operator	Description
Blank	Function not applicable.
EQ	Objects with Saved Dates equal to the date/time entered.
NE	Objects with Saved Dates not equal to the date/time entered.
LT	Objects with Saved Dates less than the date/time entered.
GT	Objects with Saved Dates greater than the date/time entered.

Saved Date value	The date must be entered in format: YYYYMMDD.
Object Type	You can specify the object type code to limit the objects selected to one or all object types. Valid object types are:

'*****'	All Objects	'**C**'	Copycodes
'**P**'	Programs	'**N**'	Subprograms
'**M**'	Maps	'**S**'	Subroutines
'**A**'	Parameter Data Areas	'**H**'	Helproutines
'**G**'	Global Data Areas	'**3**'	Dialogs
'**L**'	Local Data Areas	'**4**'	Classes

SCREEN ITEMS	DESCRIPTION
Synchronize	When this option is selected, Natural Engineer compares each object's saved date in the Repository with the saved date of the object in the Natural System File. If the object in the System File has been saved more recently than that in the Repository, Natural Engineer will re-extract that object into the Repository and overwrite the existing object. Valid options are: **Blank** No Synchronize. '**Y**' Synchronize source code. '**N**' No Synchronize.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF2	Invoke the Valid Missing Objects screen. *Note: Refer to the section Valid Missing Objects for more information on this option.*
PF3	Exit from the current function and return to previous screen.
PF5	Save Extract Selection Criteria for the application.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Repositions to the top of the Extract Selection Criteria list.
PF12	Returns to the Natural Engineer Main Menu.

Specifying Object Names

The object names specified in the Start Object and End Object columns on the Extract Selection Criteria screen use the following standard conventions:

Single Object Name

Enter full object names in Start Object list.

Multiple Object Group

Enter partial object name in Start Object list, with an asterisk (*). This will allow you to Extract all objects starting with the values before the asterisk.

Multiple Object Range

Enter a Start Object name and an End Object name in the same row. This will Extract all objects in alphanumeric order starting from the Start Object and ending with the End Object.

Combination Selection Types

You can enter multiple rows with different criteria, including multiple single objects, groups and ranges.

Examples:

Start Object	End Object	Result
*		Extracts all objects.
ABC*		Extracts all objects with names prefixed with ABC.
AC*	ND*	Extracts all objects in the alphabetic range starting from ACxxxxxx to NDxxxxxx.

Valid Missing Objects

It is possible to enter a list of object names with wildcards, to a maximum of 10 that will not be marked as missing during the Extract process.

The Valid Missing Objects option is accessed by selecting '**PF2**' (Miss) from the Extract Selection Criteria screen.

The following Figure 2-2 illustrates the Valid Missing Objects screen.

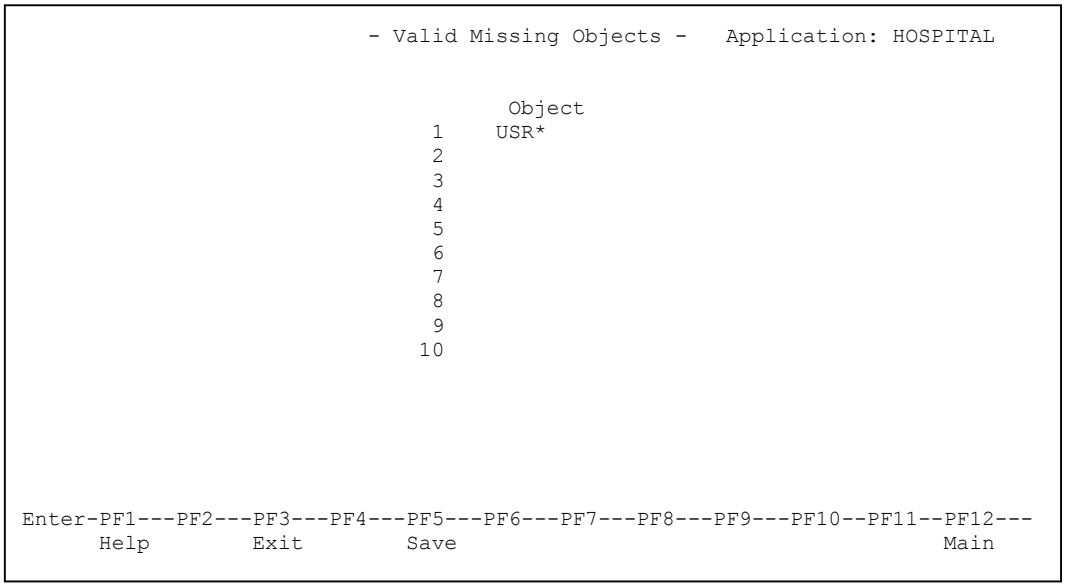

Figure 2-2 Valid Missing Objects screen

SCREEN ITEMS	DESCRIPTION	
Object Name	The object name to be marked as a valid missing object. This can be an exact name or a part name with wildcard. For Example:	
	XX003P01	Object XX003P01 would be marked as a valid missing object.
	XX001*	Any objects prefixed with XX001 would be marked as valid missing objects.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF5	Save Valid Missing Objects list for the application.
PF12	Returns to the Natural Engineer Main Menu.

Extract Source Code

This is the first real processing step in creating the Natural Engineer Repository and extracts the Natural source code for the defined application.

Natural Engineer reads the application code and creates a "neutral" view of the code, that is, irrespective of the Natural version or the mode used (structured or reporting).

The Extract process writes out files that contain the neutral application records, as well as an error file. If you are executing multiple Extract processes it is advisable to make a copy the current error file so that is always available

The Extract function also performs a basic quality check, which identifies any invalid statements or syntax within the objects. If any errors are found, they are logged and displayed on completion of the Extract process.

Related Processes

The Extract process allows you to correct errors before building the Repository. It also allows you to include identified missing objects, such as DDMs, Data Areas and Copycode before further processing. Missing objects can be seen in the Missing Natural Objects report, which can be accessed by selecting '**R**' (Application Reports) from the Environment Menu screen.

Note: For more information on the Missing Natural Objects Report refer to Chapter 3 in the Natural Engineer Reporting manual.

Objects that are no longer required in the Repository are best removed from the source library. If the Repository has been loaded, these can also be selectively deleted from the Repository using the Delete Object option under the Application menu.

Note: See the section Delete Object in Chapter 1 of this manual for more information.

This option is invoked by selecting option '**E**' (Extract Source Code) from the Environment Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 2-3 illustrates the NATRJE submission screen for the Extract Source Code option.

```
                          - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  :  (NATEXT) EXTRACT

              Job Card details
              ----------------
                       Job Name  :  XGSLXX__
                       Job Class :  _


              Job Control Record details
              --------------------------
                                Control Status  :
              Last Job Submitted - Job Name     :
                                 - Opid         :
                                 - Step         :
                                 - Return Code  :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
```

Figure 2-3 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Load Repository

The next step after Extracting the source code is to Load Natural Engineer's Repository from the output file of the Extract process. All information, cross-references, and relationships are built into the Repository for interrogation, reporting, diagramming and further processing.

Related Processes

After loading of the Repository, check the Missing Objects Report option and selectively Extract and Load those objects after adding them to the application library. Alternatively you can execute the Extract Missing Object option after adding them to the appropriate library.

The Missing Natural Objects report is accessed via the Quality Logs option. You may add new or changed objects to the loaded Repository using the Load Repository option.

This option is invoked by selecting option '**L**' (Load Repository) from the Environment Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 2-4 illustrates the NATRJE submission screen for the Load Repository option.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  :  (REPUPD) LOAD REPOSITORY

              Job Card details
              ----------------
                       Job Name  :  XGSLXX__
                       Job Class :  _


              Job Control Record details
              --------------------------
                              Control Status  :
              Last Job Submitted - Job Name    :
                                 - Opid        :
                                 - Step        :
                                 - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref              Rel              Main
```

Figure 2-4 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Extract and Load

The Extract & Load option allows you to perform both the Extract and Load operations in a single step.

Any missing objects or objects with errors identified during the Extract process will be reported, and can be added selectively to the Repository after completion of the Load process.

This option is invoked by selecting option '**X**' (Extract & Load) from the Environment Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 2-5 illustrates the NATRJE submission screen for the Extract & Load option.

```
                          - Job Submission -        Application: HOSPITAL

             Job Selection details
             ---------------------
                  Job Selected  :  (EXTLOD) EXTRACT & LOAD

             Job Card details
             ----------------
                      Job Name  :  XGSLXX__
                      Job Class :  _


             Job Control Record details
             --------------------------
                               Control Status  :
             Last Job Submitted - Job Name    :
                                - Opid        :
                                - Step        :
                                - Return Code :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
```

Figure 2-5 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Extract, Load and Impact

This option allows you to perform the Extract, Load and Impact Analysis processes in a single step.

Any missing objects or objects with errors identified during the Extract process will be reported, and can be added selectively to the Repository after completion of the Load process.

This option is invoked by selecting option '**D**' (Extract Load & Impact) from the Environment Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 2-6 illustrates the NATRJE submission screen for the Extract Load & Impact option.

```
                            - Job Submission -        Application: HOSPITAL

             Job Selection details
             ---------------------
                  Job Selected  :  (EXLDIM) EXTRACT, LOAD & IMPACT

             Job Card details
             ----------------
                      Job Name  :  XGSLXX__
                      Job Class :  _


             Job Control Record details
             --------------------------
                               Control Status  :
             Last Job Submitted - Job Name     :
                                - Opid         :
                                - Step         :
                                - Return Code  :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref               Rel               Main
```

Figure 2-6 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

Extract Missing Objects

The Extract Missing Objects option extracts the missing called objects as identified in the Missing Natural Objects report. If an object is a data area or copycode, it will also extract the calling object (unless it has been extracted in the same execution).

Note:

- *A maximum of 200 missing objects will be extracted using this process.*
- *Missing DDMs will not be extracted using this process.*

The process to follow for extracting the most complete application is:

1. Extract and Load an application into Natural Engineer.
2. Check the Missing Natural Objects report to identify any missing objects.
3. Copy those missing objects to the Natural library or Steplib library defined to Natural Engineer.
4. Run the Extract Missing objects option.

If an object is displayed on the Missing Natural Objects report but not copied as part of step 3, then the Extract process will identify this as an error with the message:

- NO SUCH OBJECT EXISTS IN DIRECTORY

If a DDM is identified as missing then the DDM should be located and copied to the application library, a defined steplib or the SYSTEM library. All objects that reference the missing DDM need to be re-extracted. Either identify the missing object by running the DDMs referenced by Object report and then selectively extracting and loading those objects, or re-execute the Extract and Load processes for all objects in the application.

This option is invoked by selecting option '**O**' (Extract Missing Objects) from the Environment Menu screen. This will open the NATRJE Job Submission screen.

The following Figure 2-7 illustrates the NATRJE submission screen for the Extract Missing Objects option.

```
                            - Job Submission -        Application: HOSPITAL

              Job Selection details
              ---------------------
                   Job Selected  :  (EXTMIS) EXTRACT MISSING OBJECTS

              Job Card details
              ----------------
                       Job Name  :  XGSLXX__
                       Job Class :  _


              Job Control Record details
              --------------------------
                                Control Status  :
              Last Job Submitted - Job Name     :
                                 - Opid         :
                                 - Step         :
                                 - Return Code  :

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Sub   Ref              Rel               Main
```

Figure 2-7 NATRJE Job Submission screen

Note: For more information on the NATRJE Job Submission screen refer to the Natural Engineer Batch Processing (Mainframes) manual.

3

APPLICATION MANAGEMENT

Chapter Overview

This chapter describes the Application Management options available from the Environment menu.

Application Management provides the facility to manage supplementary information on the objects within applications held on the Repository.

The Application Management option is accessed by selecting option '**A**' from the Environment Menu screen. This will display the Application Management sub menu screen.

The Application Management sub menu screen provides facilities for the user to add, remove and update additional information for individual objects.

The topics covered in this chapter:

1. Soft Links
2. User Documentation

Soft Links

The Soft Links option allows you to manually update the Repository with information regarding the linking between objects. A Soft Link is one where a link between two objects has been defined using an alphanumeric variable rather than a literal constant.

For example;
1) A link to a subprogram using a literal constant: -
0090 CALLNAT 'SUBPROG1' #PARAMETER-GROUP

2) A link to a subprogram using an alphanumeric variable: -
0250 MOVE 'SUBPROG1' TO #CALL-NAME
0260 CALLNAT #CALL-NAME #PARAMETER-GROUP
This is what Natural Engineer recognizes as a Soft Link.

Natural Engineer will provide a list of objects within an application that contain Soft Links statements. Only objects containing Soft Links will be available for selection from the Soft Link Maintenance screen. That is to say, any objects that use literal constants only will not be shown in the object list on this screen.

A single object may contain one or more Soft Link statements. Each statement can be selected to specify the object name reference for the Soft Link. Up to a maximum of 1008 object names may be specified per statement.

Once all the Soft Links have been specified, they will provide the cross-reference information into the inter-object tracing function within the Analysis process.

A Soft Links report is available to view instantly all the details of which Soft Links have been specified, for each statement line within each object, within the application.

Note: For more information on the Soft Links report refer to Chapter 3 in the Natural Engineer Reporting manual.

Soft Link Objects Screen

The Soft Links option is accessed by selecting option '**S**' (Soft Links) from the Application Management sub menu screen. This will display the Soft Link Objects screen with a list of the available objects containing soft links for the current application.

The following Figure 3-1 illustrates the Soft Link Objects screen showing a list of objects containing soft links.

```
                          - Soft Link Objects -     Application: SOFTLINK

                      Select  Object
                        _       SOFTLN1S
                        _       SOFTLP1S
                        _       SOFTLP2S
                        _       SOFTLP3S









                 Object Type:  *  (*,C,H,M,N,P,S)
                  Reposition:  _______________________________
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit                  Prev  Next                   Main
```

Figure 3-1 The Soft Link Objects screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object. '**D**' Delete All Soft Links for an object.
Object	List of objects containing Soft Links within an application. Objects that have had Soft Links specified and saved to the Repository, will have an asterisk (*) to the left of the object name.
Object Type	You can specify the object type code to limit the objects selected to one or all object types. Valid object types are: '*****' All Objects '**C**' Copycodes '**H**' Helproutines '**M**' Maps '**N**' Subprograms '**P**' Programs '**S**' Subroutines
Reposition	Reposition the list of objects starting from the new value entered. This value can be a complete object name or part name using **'*'** wildcard. For Example:

Value	Result
*****	Will reposition at the start of the Object list. For the HOSPITAL system, this would start the object list from object XXCONPDA.
XXE*	Will reposition at the first object name that matches the mask XXE or is greater than the mask input. For the HOSPITAL system, this would start the object list from object XXEXIT.
XX000G01	Will reposition at the first object name that matches the mask exactly or is greater than the object name input. For the HOSPITAL system, this would start the object list from object XX001L01 as object XX000G01 does not exist.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Soft Link Statements Screen

The Soft Link Statements screen is accessed by selecting an object from the Soft Link Objects screen. This will list all the Soft Link statements within the selected object.

The following Figure 3-2 illustrates the Soft Link Statements screen showing a list of statements containing soft links.

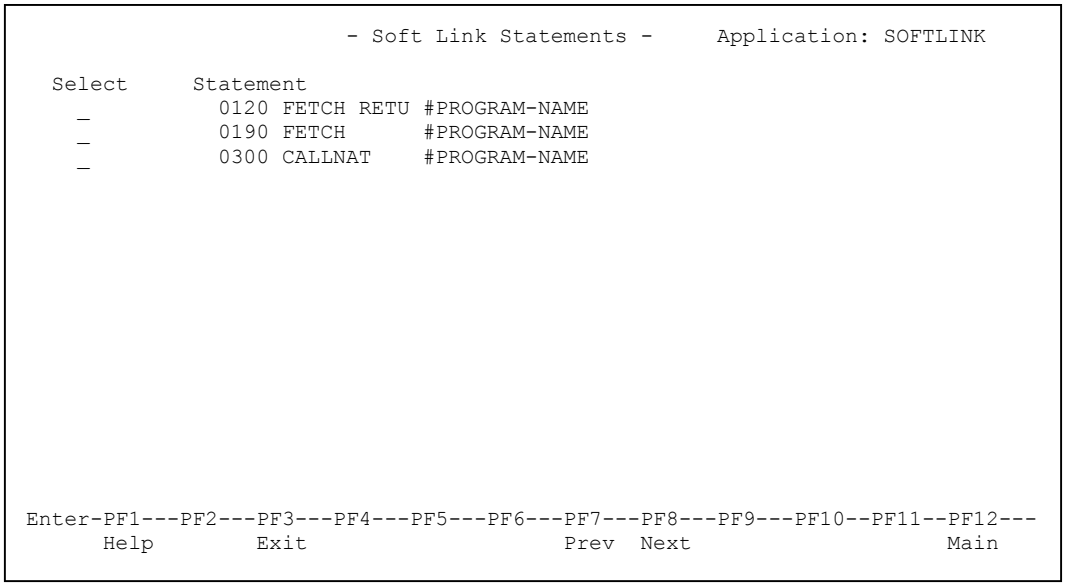

Figure 3-2 The Soft Link Statements screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual statements can be selected. Valid selections are: '**S**' Select statement.
Statement	List of statements within the selected object containing Soft Links. Each entry shows: ▪ The statement line number. ▪ The type of call. For example CALLNAT. ▪ The alphanumeric variable used to make the call. For example #PROGRAM-NAME. Statements that have had Soft Links specified and saved to the Repository, will have an asterisk (*) to the left of the statement.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF7	Displays previous page.
PF8	Displays next page.
PF12	Returns to the Natural Engineer Main Menu.

Maintain Soft Links Screen

To specify the Soft Links for a statement line within an object simply select the statement line from the Soft Link Statement screen and the Maintain Soft Links screen will be presented. On this screen it is possible to specify up to 1008 individual Soft Link names per statement line.

The following Figure 3-3 illustrates the Maintain Soft Links screen.

```
                          - Maintain Soft Links -   Application: SOFTLINK

    Object...: SOFTLP1S Statement No.: 0120
    Call Name: #PROGRAM-NAME
    Number of links: 0000                                  View 0001 to 0048
    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________

    ________   ________   ________   ________   ________   ________
Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Save        Prev  Next  Dele  Top   Find  Main
```

Figure 3-3 Maintain Soft Links screen

SCREEN ITEMS	DESCRIPTION
Object	The name of object currently selected.
Statement No.	The statement line number.
Call Name	The name of the alphanumeric variable used to make the call. For Example: #PROGRAM-NAME.
Number of links	Shows the number of Soft Link names specified for the current statement line.
View	Shows the range of Soft Link names being displayed. For Example: View: 1 to 48 indicates that you are looking at Soft Links 1 to 48.
Soft Link names	Soft Link Names can be specified as required. Each page view caters for up to 48 entries, with a maximum of 1008 entries per statement allowed.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF5	Saves the Soft Links that have been specified. A sort will be performed, sorting the Soft Link names into ascending alpha sequence. Duplicate entries will be removed.
PF7	Displays previous page.
PF8	Displays next page.
PF9	Deletes all the Soft Links for the current statement line number.
PF10	Scrolls the Soft Links list to start from the first entry.
PF11	Allows you to search for a specific Soft Link name for the currently selected statement line number. This option will search for exact names only.
PF12	Returns to the Natural Engineer Main Menu.

User Documentation

The User Documentation option allows users to specify and save information on each object within an Application. This provides useful system documentation within Natural Engineer, complementing the source code information stored on the Repository. The information that can be stored for each object falls into two main categories:

1. **Object Title**

   An object title can be specified. The default is the object name and in the case of CONSTRUCT or PREDICT generated objects, an indication of the code generator. The input is in free format style allowing a maximum of 70 characters to be input.

2. **Comments**

   These comments can be specified as required to provide detailed information on the object, such as: the function or functions performed, any database or flat file access, runtime considerations etc. The input is in free format style allowing a maximum of 50 lines of 70 characters per line. It is possible to import the 'real' object comments found at the top of an object (i.e., before the first Natural statement).

The User Documentation for each object within an Application is stored on the Repository.

User Documentation can be removed from the complete Application, a range of objects or a single object.

User Documentation Objects Screen

The User Documentation option is accessed by selecting option '**U**' (User Documentation) from the Application Management sub menu screen. This will display the User Documentation Objects screen with a list of the available objects for the current application.

The following Figure 3-4 illustrates the User Documentation Objects screen.

```
                        - User Documentation Objects - Application: HOSPITAL

                              Sel    Objects
                               _     XXCONPDA
                               _     XXCONUPD
                               _     XXEXIT
                               _     XXGETID
                               _     XXMTHVAL
                               _     XXTIDYUP
                               _     XXVALCC
                               _     XX000G00
                               _     XX001L01
                               _     XX001M01
                               _     XX001P01
                               _     XX002L01
                               _     XX002M01
                               _     XX002P01
                               _     XX021L01
                        Reposition ->  ________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit              DelA  Prev  Next        Types ImpM  Main
```

Figure 3-4 The User Documentation Objects screen

SCREEN ITEMS	DESCRIPTION
Select	This is the selection column where individual objects can be selected. Valid selections are: '**S**' Select object. '**D**' Delete comments for an object.
Object	Name of the objects in the current application which are available for selection. Objects that have had comments saved to the Repository, will have an asterisk (*) following the name.
Reposition	Reposition the list of objects starting from the new value entered. This value can be a complete object name or part name using **'*'** wildcard. For Example:

Value	Result
*	Will reposition at the start of the Object list. For the HOSPITAL system, this would start the object list from object XXCONPDA.
XXE*	Will reposition at the first object name that matches the mask XXE or is greater than the mask input. For the HOSPITAL system, this would start the object list from object XXEXIT.
XX000G01	Will reposition at the first object name that matches the mask exactly or is greater than the object name input. For the HOSPITAL system, this would start the object list from object XX001L01 as object XX000G01 does not exist.

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF6	Delete all User Documentation comments for all the objects within an application.
PF7	Displays previous page.
PF8	Displays next page.
PF10	Change the Object Types to customize the list of objects displayed. Available selections are: ▪ **Global Data Areas** ▪ **Local Data Areas** ▪ **Parameter Data Areas** ▪ **Subroutines** ▪ **Subprograms** ▪ **Helproutines** ▪ **Maps** ▪ **Programs** ▪ **Dialogs** ▪ **Copycode** ▪ **Classes**
PF11	Provides the facility to import the object comments from the object source code. The object comments imported are any comments found before the first Natural statement within an object. This option will perform the import for all the objects within an application.
PF12	Returns to the Natural Engineer Main Menu.

User Documentation Comments Screen

The User Documentation Comments screen is accessed by selecting an object from the User Documentation Objects screen.

The following Figure 3-5 illustrates the User Documentation Comments screen.

```
                    - User Documentation Comments - Application: HOSPITAL
    Title
    XX001P01_____________________________________________________________
    Comments
    ************************************************************************
    Author          : A. Coder___________________________________________
    Date Created    : 01/02/2001_________________________________________
    Function        : Main Menu Program for the Hospital system._________
    ************************************************************************
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________
    _____________________________________________________________________

Enter-PF1---PF2---PF3---PF4---PF5---PF6---PF7---PF8---PF9---PF10--PF11--PF12---
      Help        Exit        Save        Prev  Next              ImpS  Main
```

Figure 3-5 User Documentation Comments screen

SCREEN ITEMS	DESCRIPTION
Object Title	Provides the input of an object title. The default is the object name and in the case of CONSTRUCT or PREDICT generated objects, an indication of the code generator. The input is in free format style allowing a maximum of 70 characters to be input. Some examples: **XX001P01** **CON001P1 (Generated by Construct)** **PREDP01 (Generated by Predict)** **ABC00G01 – Global Data Area**
Comments	Provides the ability to input any required object comments to document the object. The input is in free format style allowing a maximum of 50 lines, each of which can have a maximum of 70 characters to be input. For example: **This program calculates the Tax value required for each sale based on a table of tax rates. The base rate is 12.25%.**

PFKEYS	DESCRIPTION
PF1	Activates the help function.
PF3	Exit from the current function and return to previous screen.
PF5	Saves the specified User Documentation comments.
PF7	Displays previous page.
PF8	Displays next page.
PF11	Provides the facility to import the object comments from the object source code. The object comments imported are any comments found before the first Natural statement within an object. This option will perform the import for the current selected object only.
PF12	Returns to the Natural Engineer Main Menu.

4

APPLICATION INVENTORY

Chapter Overview

This chapter provides a basic overview of the reporting available for the Application and Environment functions described in this manual.

Once an application has been defined and then extracted from the Natural application library and loaded into the Repository, Natural Engineer provides a series of reports that detail the structure and contents of the applications.

The Application Reports option can be accessed by selecting '**R**' from the Environment Menu screen.

Note: This chapter does not describe the individual reports available in the Application Reports option from the Environment menu. For more information on these reports refer to the Natural Engineer Reporting manual.

Application Reports

The Application Reports provide various levels of Analysis information on the application after it is loaded in the Repository (i.e., before Impact Analysis).

The following list illustrates the Application Reports that are available:

- Extract Source Code Summary
- Missing Natural Objects
- Unused Natural Objects
- Source Code Summary
- Object Summary
- Natural Keywords Summary
- Objects Referencing Objects
- Objects Referenced by Objects
- Objects Referenced by DDM fields
- External Objects Referenced by Objects
- Construct Models Referenced by Objects
- DDMs Referenced
- DDMs Referenced by Objects
- DDMs Accessed by Objects
- Data Item Inventory
- Data Item Usage Inventory
- Database Data Requirements
- Soft Links
- Entry Point Diagram

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